

WE CLAIM:

1. A method of bi-directional communication between a spreadsheet application and a database, comprising:
 - connecting a spreadsheet to a data source;
 - publishing data from the spreadsheet to the data source; and
 - storing the data at the data source including writing any changes made to the data in the spreadsheet over corresponding data previously stored at the data source.
2. The method of Claim 1, whereby the data source is a SharePoint data source.
3. The method of Claim 1, whereby connecting a spreadsheet to a data source includes connecting the spreadsheet to the data source via a bi-directional communication protocol.
4. The method of Claim 3, whereby the bi-directional communication protocol includes an OLE-DB communication protocol.
5. The method of Claim 3, whereby connecting the spreadsheet to the data source via a bi-directional communication protocol includes connecting the spreadsheet to the data source via a data provider application.

6. The method of Claim 1, prior to publishing the data from the spreadsheet application to the data source,

importing the data to the spreadsheet from the data source;

modifying the imported data in the spreadsheet; and

whereby publishing the data to the data source includes publishing the modified imported data back to the data source and writing the modified imported data over the data in the data source from which the data was imported to the spreadsheet.

7. The method of Claim 5, prior to publishing the data from the spreadsheet to the data source, passing the data to the data provider application.

8. The method of Claim 7, whereby at the data provider application, storing the data in a memory cache.

9. The method of Claim 1, prior to storing the data at the data source, determining whether publishing the data to the data source creates an error condition.

10. The method of Claim 9, whereby determining whether publishing the data to the data source creates an error condition includes querying the data source by a data provider application for determining whether publishing the data to the data source creates an error condition.

11. The method of Claim 9, whereby if publishing the data to the data source creates an error condition, returning an error message to the spreadsheet.

12. The method of Claim 11, whereby returning an error message to the spreadsheet includes identifying a data publication error associated with the error condition.

13. The method of Claim 12, whereby the data publication error is a user permission error.

14. The method of Claim 12, whereby the data publication error is a data source not available error.

15. The method of Claim 12, whereby the data publication error identifies that a data source schema does not support publication of the data.

16. The method of Claim 12, whereby the data publication error identifies that the data source does not support one or more data types associated with the published data.

17. The method of Claim 1, prior to storing the data at the data source, determining whether publishing the data to the data source creates a conflict with data previously published to the data source.

18. The method of Claim 17, whereby determining whether publishing the data to the data source creates a conflict with data previously published to the data source includes comparing the data with data previously published to the data source.

19. The method of Claim 18, whereby comparing the data with data previously published to the data source includes comparing the data by a data provider application.

20. The method of Claim 17, whereby if publishing the data to the data source creates a conflict with data previously published to the data source, passing an identification of any of the data that creates a conflict with data previously published to the data source to the spreadsheet for alerting a user of the spreadsheet as to the data conflict.

21. The method of Claim 17, whereby if publishing the data to the data source creates a conflict with data previously published to the data source, resolving the conflict by accepting a latest data published to the data source.

22. The method of Claim 17, whereby if publishing the data to the data source creates a conflict with data previously published to the data source, resolving the conflict by discarding any of the data that conflicts with corresponding data of the data previously published to the data source.

23. The method of Claim 17, whereby if publishing the data to the data source creates a conflict with data previously published to the data source, resolving the conflict by merging the data with the data previously published to the data source such that for any portion of the data that conflicts with a corresponding portion of the data previously published to the data source, writing over the corresponding portion of the data previously published to the data source with any portion of the data that conflicts with the corresponding portion of the data.

24. The method of Claim 1, further comprising breaking a communication link between the spreadsheet and the data source; and

persisting any data modified in the spreadsheet after breaking the communication link;

establishing a second communication link between the spreadsheet and the data source;

publishing to the data source the data modified in the spreadsheet after breaking the communication link to the data source; and

modifying data previously published to the data source with the data modified in the spreadsheet after breaking the communication link to the data source.

25. The method of Claim 1, whereby publishing the data to the data source includes creating a new data row in the data source.

26. The method of Claim 1, whereby publishing the data to the data source includes deleting a data row from the data source.

27. The method of Claim 1, whereby publishing the data to the data source includes creating a new data column in the data source.

28. The method of Claim 1, whereby publishing the data to the data source includes deleting a data column from the data source.

29. A method of bi-directional communication between a spreadsheet application and a database, comprising:

- connecting a spreadsheet to a data source;
- importing data to the spreadsheet from the data source;
- modifying the imported data in the spreadsheet; and
- publishing the modified imported data back to the data source and writing the modified imported data over the data in the data source from which the data was imported to the spreadsheet.

30. The method of Claim 29, whereby connecting a spreadsheet to a data source includes connecting the spreadsheet to the data source via a bi-directional communication protocol through a data provider application.

31. The method of Claim 30, prior to publishing the modified imported data back to the data source, querying the data source by the data provider application for determining whether publishing the data to the data source creates an error condition; and if publishing the data to the data source creates an error condition, returning an error message to the spreadsheet.

32. A method of bi-directional communication between a spreadsheet application and a database, comprising:

- connecting a spreadsheet to a data source via a bi-directional communication protocol allowing data to flow between the spreadsheet and the data source;

- importing data to the spreadsheet from the data source;

- modifying the imported data in the spreadsheet;

- exporting the modified imported data back to the data source and writing the modified imported data over the data in the data source from which the data was imported to the spreadsheet; and

- determining whether writing the modified imported data to the data source creates a conflict with data previously written to the data source by comparing the modified imported data with data previously written to the data source.

33. The method of Claim 32, further comprising:

- notifying a user of the spreadsheet of a conflict via a data conflict message passed to the spreadsheet via the bi-directional communication protocol; and

- resolving the conflict by writing the modified imported data to the data source or by discarding the modified imported data so as to persist the data previously written to the data source.